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3 Title

Interim Guidance on Superfund Selection of Remedy

4 Summary of Directive *(Include brief statement of purpose)*

Provides interim guidance regarding implementation of SARA cleanup standards provisions. Highlighting new requirements and emphasis in the RI/FS and ROD process.

5. Keywords: Superfund, CERCLA, Reauthorization Implementation, Remedial, SARA

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9 Name and Title of Approving Official: J. Winston Porter, AA/OSWER — Date: 12/24/86

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 24 1986

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

9355.0-19

MEMORANDUM

SUBJECT: Interim Guidance on Superfund Selection of Remedy

FROM: J. Winston Porter
Assistant Administrator

TO: Regional Administrators, Regions I - X
Regional Counsel, Regions I - X
Director, Waste Management Division
Regions I, IV, V, VII, and VIII
Director, Emergency and Remedial Response Division
Region II
Director, Hazardous Waste Management Division
Regions III and VI
Director, Toxics and Waste Management Division
Region IX
Director, Hazardous Waste Division
Region X
Environmental Services Division Directors
Regions I, VI, and VII

Introduction

Section 121 of the Superfund Amendments and Reauthorization Act (SARA) addresses the cleanup standards for Superfund remedial actions. While the new statute retains the basic components of the existing Remedial Investigation/Feasibility Study (RI/FS) and Record of Decision (ROD) process, the §121 provisions add some new requirements and special emphasis to certain issues. This guidance is intended to aid Regions in selecting remedial actions pending the Agency's upcoming revision of the National Contingency Plan (NCP).

This guidance memorandum builds on the transition guidance issued October 24, 1986 ("Implementation Strategy for Reauthorized Superfund: Short Term Priorities for Action," OSWER Directive 9200.3-02) and elaborates on the guidance related to implementation of selection of remedy requirements outlined at the Superfund Implementation Meeting of November 19 - 20, 1986.

This is one of several interim guidances we plan to issue on some of the more difficult cleanup standards issues. The Selection of Remedy Workgroup, which has been meeting since July and includes representatives from Regions and States in addition to a wide variety of Headquarters offices, is currently engaged in drafting language for the NCP regulation and preamble. A number of issues related to applicable or relevant and appropriate Federal and State requirements, cost-effectiveness, and challenges associated with an increased use of treatment will be addressed.

In addition to this and subsequent interim guidances, we will attempt to meet short-term Regional implementation needs by making Headquarters staff available, upon your request, to assist your staffs as they modify their RI/FS workplans for ongoing projects in January and February, 1987. In preparation for these project review sessions, Regions in conjunction with State-lead Agencies, should begin to examine ongoing projects and draft a list of potential changes that will be required to satisfy §121 of SARA. Regional staff should use this guidance and the transition guidance as the basis for proposed workplan revisions.

As soon as possible, Regions should notify potentially responsible parties (PRPs) conducting RI/FSs of the new SARA provisions and discuss with them any necessary modifications of their workplans.

We will continue to delegate remedy selection authority to Regions. In support of this effort over the longer term we will be revising the RI/FS Guidance and ROD Guidance and holding related workshops in the Spring of 1987. Also, Headquarters will be available to assist Regions with final FS revisions and ROD preparation throughout the fiscal year.

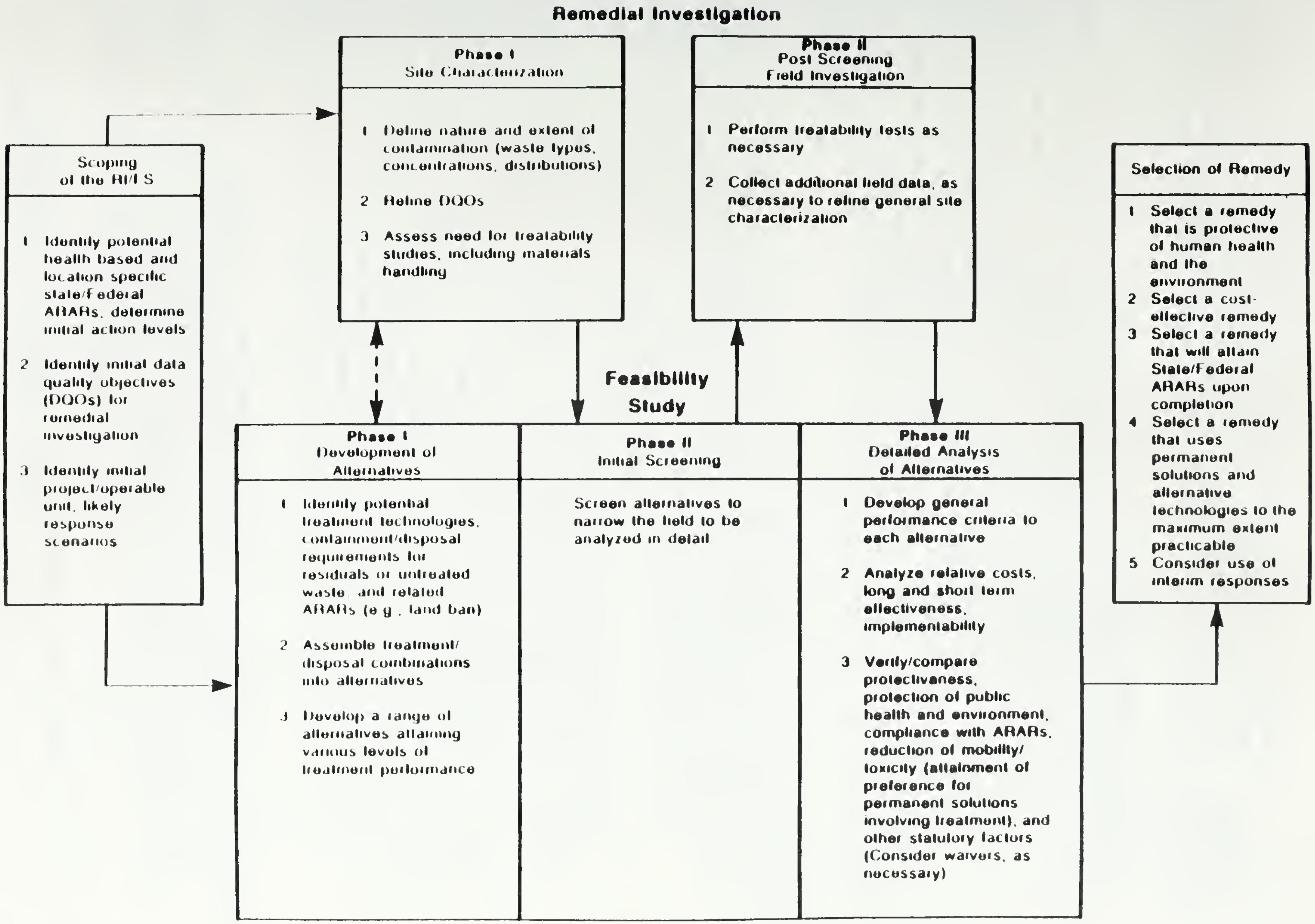
Overview of the Process

Under SARA, the remedial process retains its major analytical components: a remedial investigation (RI) in which data about site and waste characteristics, their hazards, and routes of exposure are collected and analyzed, and in which data about treatability of wastes and performance of treatment processes is assembled as necessary; and a feasibility study (FS) in which a number of potential remedial alternatives are developed and screened, and the most promising subset of alternatives is evaluated against a range of factors and compared against one another. This process culminates in the selection of a remedy.

Figure 1 suggests that the RI may need to be conducted in at least two phases, while the FS will retain the three phases described in the current NCP. The RI/FS has been evolving into a more interactive process: as the FS progresses, more sophisticated data are required to assess the feasibility of an alternative. In addition to a literature survey, more site

Figure 1

Proposed Remedy Selection Process Under Reauthorization



Scoping of the RI/FS

1 Identify potential health based and location specific state/Federal ARARs, determine initial action levels

2 Identify initial data quality objectives (DQOs) for remedial investigation

3 Identify initial project/operable unit, likely response scenarios

Phase I Site Characterization

1 Define nature and extent of contamination (waste types, concentrations, distributions)

2 Refine DQOs

3 Assess need for treatability studies, including materials handling

Phase II Post Screening Field Investigation

1 Perform treatability tests as necessary

2 Collect additional field data, as necessary to refine general site characterization

Phase I Development of Alternatives

1 Identify potential treatment technologies, containment/disposal requirements for residuals or untreated waste, and related ARARs (e.g., land ban)

2 Assemble treatment/disposal combinations into alternatives

3 Develop a range of alternatives attaining various levels of treatment performance

Phase II Initial Screening

Screen alternatives to narrow the field to be analyzed in detail

Phase III Detailed Analysis of Alternatives

1 Develop general performance criteria to each alternative

2 Analyze relative costs, long and short term effectiveness, implementability

3 Verify/compare protectiveness, protection of public health and environment, compliance with ARARs, reduction of mobility/toxicity (attainment of preference for permanent solutions involving treatment), and other statutory factors (Consider waivers, as necessary)

Selection of Remedy

1 Select a remedy that is protective of human health and the environment
2 Select a cost-effective remedy
3 Select a remedy that will attain State/Federal ARARs upon completion
4 Select a remedy that uses permanent solutions and alternative technologies to the maximum extent practicable
5 Consider use of interim responses

data and/or bench- or pilot-scale testing of a treatment technology may be needed. Likewise, the RI has become a phased process wherein the data quality objectives (DQOs) are tailored to the need for additional site, waste, and treatment performance information.

While the basic framework remains intact, SARA does add some new features and emphasis. The most significant emphasis is on risk reduction through destruction or detoxification of hazardous waste by employing treatment technologies which reduce toxicity, mobility or volume rather than protection achieved through prevention of exposure. SARA calls for the Agency to prefer remedies that use treatment to permanently and significantly reduce the toxicity, mobility, or volume of wastes over remedies that do not use such treatment. In addition, SARA requires that the Agency select a remedy that utilizes permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable.

It should be noted that volume reduction should be considered distinctly from reducing toxicity and/or mobility; some treatment processes will increase the volume of contaminated material while effectively reducing toxicity or mobility, whereas other processes may reduce volume and consequently increase the concentration of constituents which increases the toxicity and/or mobility of the contaminants.

Another significant change is the codification of the CERCLA Compliance Policy. First published as an appendix to the preamble of the current National Contingency Plan (50 FR 47946, Wednesday, November 20, 1985), this policy required that Superfund remedial actions attain the applicable or relevant and appropriate requirements (ARARs) of other Federal environmental statutes. Furthermore, Section 300.68 of the NCP specifically refers to ARARs in regard to the development of alternatives. SARA incorporates this requirement into statutory law while adding the provision that remedial actions also attain State requirements more stringent than Federal requirements if they are also applicable or relevant and appropriate.

Also integral to the remedy selection process is SARA's incorporation, with some modifications, of the Superfund program's existing State involvement and community relations processes. The new statute basically formalizes practices the Agency has pursued and highlights the importance of early, constant, and responsive relations with both the States and communities affected by Superfund sites.

A discussion of how SARA affects each particular phase of the remedy selection process follows.

Scoping of the RI/FS

In this phase, a workplan for the RI and the FS is prepared to undertake the studies. Existing data about the site from previous investigations, including Preliminary Assessment and Site Investigation data collected for the National Priorities Listing, are assembled and evaluated. Initial project boundaries are identified, and a preliminary decision made on whether the entire site will be evaluated and remedied as a single unit or subdivided into two or more operable units.

Most significant in this phase is the preliminary identification of applicable or relevant and appropriate requirements that alternatives will need to attain. At this early stage in the process, Regions and States should begin identifying potential health-based requirements related to determining initial action levels, requirements which restrict activities that can be undertaken at different locations, (such as floodplains, wetlands, and historic sites), and on whether the requirements might be met at the completion of each operable unit or the total site remedy. Also, States should begin to identify and notify Regions of State requirements that may be potentially applicable or relevant and appropriate to the site.

Initial data quality objectives (DQOs) should also be established to ensure that environmental, health effects and treatability data will be of adequate quality and appropriate for their intended uses.

Site Characterization (RI Phase I)

This phase focuses on defining the nature and extent of contamination through field sampling and laboratory analysis to determine initial cleanup goals and to characterize waste types, mixtures, volume, the media in which they occur, concentration ranges and profiles, and interface zones between media. An analysis is conducted to characterize and assess risks, routes of exposure, fate and transport of contaminants, and likely human and environmental receptors. DQOs should be evaluated to identify data use, type, quality, and quantity. DQOs should be refined to ensure that forseeable needs for environmental, health effects, and treatability data will be met. At the completion of this stage, Regions should supply the Agency for Toxic Substances and Disease Registry with the data and analytical results.

<u>Development of Alternatives</u> (FS Phase I)

This stage may begin concurrently with or slightly behind the RI and consists of three major steps: identifying potential treatment technologies and their associated containment or disposal requirements; prescreening of technologies for suitability as part of alternatives, and assembling technology and/or disposal combinations into alternatives.

Treatment alternatives should be developed ranging from an alternative that, to the degree possible, would eliminate the need for long-term management (including monitoring) at the site to alternatives involving treatment that would reduce toxicity, mobility, or volume as their principal element. Although alternatives may involve different technologies (which will most often address toxicity and mobility) for different types of waste, they will vary mainly in the degree to which they rely on long-term management of treatment residuals or low-concentrated wastes.

In addition to the range of treatment alternatives, a containment option involving little or no treatment and a no action alternative should also be developed.

<u>Initial Screening</u> (FS Phase II)

The purpose of the screening step is to reduce the number of alternatives for further analysis while preserving a range of options. Consultation between the Agency and the State is very important at this stage. This screening is accomplished by considering the alternatives against effectiveness, implementability and cost factors. Cost is an important factor when comparing alternatives which provide similar results (i.e., cost may be used to discriminate among treatment alternatives, but not between treatment and nontreatment alternatives).

In some situations the above factors could occasionally result in elimination of alternatives which involve treatment of the source as the principal element (e.g., large, complex sites such as municipal landfills). Typically, ground water actions will be necessary at such sites to achieve adequate protection. The ROD must explain the rationale for eliminating source treatment options at this point in the process.

Innovative technologies should be carried through the screen if there is reasonable belief that they offer potential for better treatment performance or implementability, few or lesser adverse impacts than other available approaches, or lower costs than demonstrated technologies.

Post Screening Field Investigation (RI Phase II)

This phase of the RI should focus on collecting data sufficient to make a well-substantiated remedy selection decision. After a literature survey is conducted to identify existing treatment data, treatability tests at the bench- and sometimes pilot-scale may be necessary to test a particular technology on actual site waste. Additional field data may be collected as needed to further assess alternatives.

Detailed Analysis (FS Phase III)

The alternatives passing through the initial screen should be analyzed in further detail against a range of factors and compared against one another.

The effectiveness of the alternatives should be assessed, taking into account whether or not an alternative adequately protects human health and the environment and attains Federal and State ARARs, whether or not it significantly and permanently reduces the toxicity, mobility, or volume of hazardous constituents, and whether or not it is technically reliable.

Alternatives should be evaluated against implementability factors, including the technical feasibility and availability of the technologies each alternative would employ, the technical and institutional ability to monitor, maintain, and replace technologies over time; and the administrative feasibility ot implementing the alternative.

Finally, the costs of construction and the long-term costs of operating and maintaining the alternatives should be analyzed using present-worth analysis.

Both the short- and long-term effects of each of these factors must be assessed. In considering these items, Regions will address all of the long-term effectiveness factors cited in SARA §121(b)(1). After each alternative has been analyzed against these factors, the remedial options should be compared for their relative strengths and weaknesses.

Upon completion of the RI and draft FS, EPA and the State should formulate a recommended alternative or approach to present to the community when the FS goes out for public comment. At this point, the RI/FS is transmitted to ATSDR for their use in preparing a health assessment.

Selection of Remedy

The remedial action for a site should be selected among those alternatives about which the following four findings can be made:

- Remedies must be protective of human health and the environment. This means that the remedy meets or exceeds ARARs or health-based levels established through a risk assessment when ARARs do not exist.

- Remedies should attain Federal and State public health and environmental requirements that have been identified for a specific site. In general, the remedy selection process presumes that alternatives will be formulated and refined to ensure that they attain all of the appropriate ARARs. However, SARA does provide waivers which permit selection of remedies which do not attain all ARARs under six different types of circumstances: fund-balancing, technical impracticability, interim remedy, greater risk to health and the environment, equivalent standard of performance, and inconsistent application of State standards. If a remedy is protective, cost-effective, and adequately satisfies the statutory preferences, inability to attain a particular ARAR will not necessarily prevent selection of that alternative if it was viewed as the all around best remedial alternative.

- Remedies must be cost-effective. In general, this finding requires ensuring that the results of a particular alternative cannot be achieved by less costly methods. This implies that for any specific site there may be more than one cost-effective remedy, with each remedy varying in its environmental and public health results.

- Remedies must utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination is interrelated to the cost-effectiveness finding and includes consideration of technological feasibility and availability.

The selected remedy should represent the best balance across all the effectiveness, implementability, and cost factors examined in the detailed analysis. In making this selection, the decision-maker must consider the statutory preference for treatment which permanently and significantly reduces the toxicity, mobility or volume of the waste.

The program permits the staging of remedial action implementation through multiple operable units. Decisionmakers may choose to implement a limited measure to stabilize a site when a suitable technology for that site is not currently available but clearly on the horizon or capacity for the desired technology is currently unavailable. Initial cleanup actions should not impede implementation of subsequent phases.

Writing the ROD

The Record of Decision (declaration statement and supporting documentation) is the centerpiece of the administrative record against which the Agency's decisionmaking may be judged by the courts. In addition to containing an accurate and complete summary of the site, the threat it poses, and the selected remedy, the ROD must describe the relative strengths and weaknesses of each alternative considered and offer a clear justification for the final decision that is made. For Fund-financed actions, the ROD should include a formal written concurrence from the State.

Specific statements and explanations that should appear in the ROD include the following:

- A statement and justification that the selected remedy is protective and cost-effective, attains ARARs and utilizes permanent solutions and treatment technologies to the maximum extent practicable, where all statutory requirements and preferences are fully satisfied.

- An explanation as to why an alternative that would have reduced the toxicity, mobility, or volume of waste was not selected if the selected remedy does not satisfy the preference for permanent solutions.

- A statement that indicates whether a remedy which does not satisfy the statutory preferences for treatment is intended as the final remedy for that site (at a minimum this remedy would have to be protective and cost-effective) or whether the action is an operable unit that will be followed by subsequent actions to achieve a final remedy which satisfies the preferences. The timeframe for completing the total remedy should be specified.

- A description of those Federal and State requirements which were found to be applicable or relevant and appropriate to the site and will be met. In addition, where ARARs do not exist, a description of the health-based level that will be met.

- A statement of which ARARs will not be met and the waiver that will be invoked to justify the nonattainment.

- In those occasional situations where no treatment alternative was carried through the screen to the detailed analysis (for sites such as municipal landfills) a special explanation should be included in the ROD.

Decisionmakers have some flexibility as to how specific the ROD is regarding the use of treatment technologies. At a minimum, the ROD should state what technology will be applied to what type and amount of waste and the performance goal that process is expected to reach. For instance, the ROD may state that thermal destruction is the selected remedy. However, the

effectiveness, implementability, and cost analyses must be based on a specific process within that technology category, such as rotary kiln, to ground the analysis in hard data. When the remedial action is bid, any process in that technology category stated in the ROD would be eligible provided they could match the performance goals of the process analyzed in detail.

Applicability to Ongoing Projects

Superfund reauthorization affects a wide variety of projects in many different stages of development. The cleanup standards provisions in §121 will affect ongoing projects in a particularly unique way. For projects closest to ROD signature, Regional managers and project managers should focus on whether an adequate range of treatment alternatives was considered for feasibility, and whether Federal and particularly State ARARs have been thoroughly considered and will be met, unless a waiver is to be invoked. If there is a sound basis for selecting and rejecting alternatives under the new statutory requirements and preferences, Regions should proceed to ROD signature and may postpone treatability studies (that would otherwise be conducted in the RI/FS) until remedial design.

On the other hand, projects in their early stages should be modified to be consistent with the process outlined in this guidance. In particular, Regions should assess the need for treatability testing and initiate immediately studies necessary to ensure availability of needed data in the detailed analysis phase.

Ground Water Operable Units

With the exception of specific statements in §121(d)(2)(A)(ii) and §121(d)(2)(B)(i) and (ii), the cleanup standards provisions apply most directly to source control measures. The existing approach toward ground water remediation outlined in the "Draft Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites (September 29, 1986)" remains largely intact with some modifications necessary to conform to SARA requirements related to ARARs. Specific guidance on ARARs, including MCLGs and WQC, will be provided in the near future.

The remedial approach outlined in the Draft Guidance derives directly from EPA's Ground Water Protection Strategy, which states that ground waters should be protected differentially based on characteristics of vulnerability, use and value. Superfund's Draft Guidance calls for the development of a limited number of ground water remedial alternatives within a performance range, defined in terms of different remediation levels (the level of ground water contaminant reduction achieved), and different rates of restoration (the time required to achieve remediation levels).

Factors that influence a decision regarding the appropriate rate of restoration are:

- Feasibility of providing an alternative water supply;
- Current use of ground water;
- Potential need for ground water;
- Effectiveness and reliability of institutional controls;
- Ability to monitor and control the movement of contaminants in ground water;
- Other risks borne by the affected population; and
- Population sensitivities.

Additionally, limiting the extent of contamination, the impact of contamination on environmental receptors, the technical practicability and the cost of alternatives should also be analyzed and factored into the decision-making process.

Should you have any questions concerning this guidance, please contact Bill Hanson (FTS 382-2345) in the Hazardous Site Control Division or John Cross (FTS 475-6770) in the CERCLA Enforcement Division.